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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,059	10/26/2001	David F. Bocian	407T-300800US	9383
22434	7590	02/06/2007		
BEYER WEAVER LLP P.O. BOX 70250 OAKLAND, CA 94612-0250			EXAMINER CHO, JENNIFER Y	
			ART UNIT	PAPER NUMBER
			1621	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/06/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/040,059

Applicant(s)

BOCIAN ET AL.

Examiner

Jennifer Y. Cho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-98 is/are pending in the application.
- 4a) Of the above claim(s) 3,17-19, 21, 33-98 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-16,20 and 22-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4/2003, 1/2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **Detailed Action**

This office action is in response to Applicant's communication filed on 12/11/2006.

Claims 1-98 are pending in this application.

Applicant's election of Group 1, claims 1-32 in the reply filed on 12/11/2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Thus claims 33-98 are withdrawn from consideration being drawn to the non-elected invention. Applicant's election of "porphyrinic macrocycle", "silicon", "coating the surface" and "primary alcohol is acknowledged herewith. Thus, additionally, claims 3, 17-19 and 21 are hereby withdrawn from consideration being non-readable on the elected species. In view of prior art found while examining the elected species, which clearly renders the claims unpatentable, the election is granted force and effect. Accordingly, the claims have been examined solely to the extent of the elected species.

### **IDS**

The information disclosure statements (IDS) filed on 4/21/2003 and 1/6/2003. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### **Drawings**

The drawings were received on 10/26/2001. These drawings are accepted.

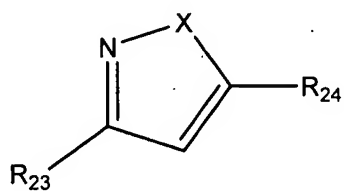
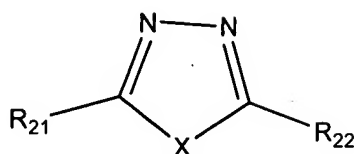
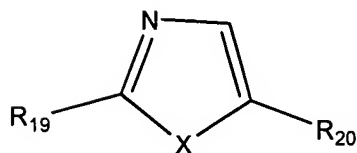
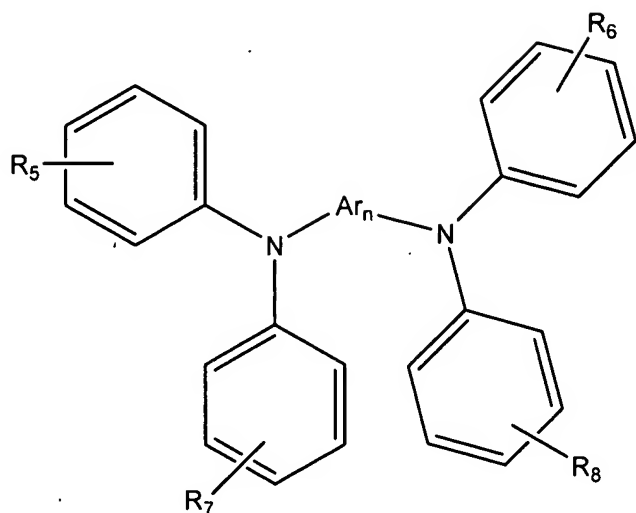
### **Claim Rejections – 35 USC 112**

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, because of a scope of enablement issue. A reading of the applicant's specification indicates that the terms "organic molecule", "solvent" and "high-boiling solvent" are too broad. For example, the specification does not enable the following organic molecules dissolved in water or toluene as described in Marks et al. (US Patent 5,834,100) (figure 2C, figure 4A, 4B, 4C, page 15, example 7b).

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Thus the term "organic molecule" should be limited to compounds from claim 10, more specifically in claim 12, the terms "solvent" and "high-boiling solvent" should be limited to the compounds in claim 24. The Examiner suggests that these limitations be inserted into claim 1. Thus, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with the absence of these limitations. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

### **Claim Rejections – 35 USC 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being confusing. Applicant has not clearly stated what “rapidly removed” means. Clarification is requested.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being confusing. Applicant has not clearly stated what “protective coating” means. Clarification is requested.

Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being confusing. Applicant has not clearly stated what “high-boiling” means. Clarification is requested.

Claims 31 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being confusing. It is not known that “free radical initiators” by themselves would halogenate compounds. Applicant is advised to correct the claim language and include all the components of halogenation.

### **Claim Rejections – 35 USC 102**

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 11-13 are rejected under 35 U.S.C. 102b as being anticipated by Marks et al. (US 5,834,100).

Marks et al. teaches a self-assembly method (column 3, line 32) of coupling porphyrinic molecules (column 2, lines 28-29, column 9, line 6) to a surface with halogenated silicon (column 7, lines 1-17). The porphyrinic molecules are alcohol-terminated and in solvent, which is contacted with the silicon surface through a Si-O bond (figure 5A, sheet 3 of 6; column 3, lines 28-39; column 6, line 4; column 7, lines 1-17; example 7b, column 15, lines 25-40)). Therefore these claims are fully met.

### **Claim Rejections – 35 USC 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 8-15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marks et al. (US 5,834,100), in view of Lindsey (US 6,212,093 B1).

The teaching of Marks et al. is described earlier.

Marks et al. is deficient in that it does not teach the contacting in the presence of a base with the limitations of claim 9, nor that the organic molecule is redox active, nor that the molecule is a porphyrin, nor that it is substituted in the beta or meso position, nor that it has the limitations of claim 14, nor that the contacting comprises coating, nor that the solvent is selected from the limitations in claim 24.

Lindsey teaches that the contacting/coupling is in the presence of the base N,N-diisopropylethylamine (column 39, lines 29-30), the organic molecule is redox active (column 11, lines 23-24), the organic molecule is a porphyrin macrocycle substituted at the  $\beta$ - position or at the *meso*- position (column 8, lines 26-28).

In reference to claim 14, it is the position of the Examiner that the energy state of these porphyrinic macrocycles with respect to each other is obvious. In reference to claim 15 and 20, it is the position of the Examiner that every element can be done in part, thus it is obvious to one of ordinary skill in the art to apply the solution to certain regions and not to other regions and to apply the solution via an appropriate method, including coating.

Therefore, it would be prima facie obvious to one of ordinary skill in the art at the time of the invention, to substitute the limitations of Lindsey for the coupling of Marks et al.. The expected result would be the effective coupling of a porphyrinic macrocycle to a silicon surface for semiconductor fabrication.

Claims 1-2, 4-7, 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marks et al. (US 5,834,100), in view of Fang (US 4,702,965).

The teaching of Marks et al. is described earlier.



Marks et al. is deficient in that the surface does not includes passivation (hydrogen passivated), n-doped silicon or p-doped silicon.

Fang teaches the development of a semiconductor in which the surface is silicon, which includes a passivation, n-doped silicon and p-doped silicon layer (column 3, lines 61-64).

Therefore, it would be prima facie obvious to one of ordinary skill in the art at the time of the invention, to substitute the limitations of Fang for the surface of Marks et al. because they are in the same art and are for the same purpose. The expected result would be the effective coupling of an organic molecule to a surface for semiconductor fabrication.

Claims 1-2, 11-12, 20, 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marks et al. (US 5,834,100), in view of Batzel et al. (US 5,280,183).

The teaching of Marks et al. is described earlier.

Marks et al. is deficient in that the hydroxyl group substituent does not include primary alcohols, the contacting does not happen through a coating method, the solvent used is not dimethylformamide and the solution is not heated to boiling/reflux in which the solvent comes off under vacuum.

Batzel et al. teaches the development of semiconducting films (see abstract) through multiring porphyrin and similar compounds (column 2, lines 47-51) that contain hydrophilic hydroxyl atoms (column 4, lines 18-19) attached to it, through a silicon oxygen bond (column 5, lines 16-17). The hydroxyl group includes various groups, which would include primary alcohols (column 5, lines 46-50). The contacting happens

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through a coating method (column 2, lines 52-56). The solvents used are high boiling solvents, which include dimethylformamide (column 9, line 7) and 1,2,4-trimethylbenzene (column 10, lines 5-10). The solution is heated to boiling/reflux in which the solvent comes off under vacuum (column 10, lines 5-10).

Therefore, it would be prima facie obvious to one of ordinary skill in the art at the time of the invention, to substitute the limitations of Batzel et al. for the procedures and compounds of Marks et al. The expected result would be the effective coating and coupling of a porphyrin compound through a silicon oxygen bond for semiconductor fabrication.

Claims 1-2, 11-13, 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marks et al. (US 5,834,100), in view of Ishihara et al. (US 4,772,486).

The teaching of Marks et al. is described earlier.

Marks et al. is deficient in that iodine or ICl (iodine bonded to chlorine) is not used to halogenate.

Ishihara et al. teaches (column 6, lines 26-27) halogenation by iodine ( $I_2$ ) and ICl (iodine bonded to chlorine) to form the active species

Therefore, it would be prima facie obvious to one of ordinary skill in the art at the time of the invention, to use the halogenation agents of Ishihara et al. to make the active species of Marks et al. The expected result would be the effective formation of a coupling agent to form silicon oxygen bond for semiconductor fabrication.

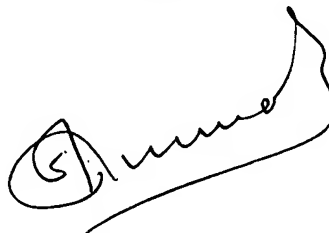
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Y. Cho whose telephone number is (571) 272 6246. The examiner can normally be reached on 9 AM - 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on (571) 272 0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Art Unit: 1621

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